Curriculum Vitae

Dr. Kuldeep Singh Yadav
Assistant Professor
Department of Mathematics, Bioinformatics and Computer Applications
Maulana Azad National Institute of Technology Bhopal
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Contact Information

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Maulana Azad National Institute of Technology Bhopal,
Bhopal-462003, Madhya Pradesh

Education

- **PhD** (Jul 2017 - Aug 2022) in Applied Mathematics (Mathematical Biology)
  Indian Institute of Technology Guwahati, Guwahati, India
  Thesis topic: On the penetration and distribution of drugs into biological tissues: A multiscale approach
  Thesis advisor: Prof. Durga Charan Dalal
- **MSc** (2015 - 2017) in Mathematics
  Indian Institute of Technology Delhi, Delhi, India
  Thesis topic: The singular value decomposition with some applications
  Thesis advisor: Prof. S. Chandra Sekhara Rao
- **BSc** (2012 - 2015) in Mathematics
  Sri Venkateswara College (University of Delhi), New Delhi, India

Research Interests

- Computational fluid dynamics
- Finite difference and finite volume methods
- Mass transport
- Modelling biological systems
- Multiscale methods
- Modelling interface processes
- Drug release/delivery
- Tumor modelling
- Physics Informed Neural Network (PINN)
- Finite Element Methods

Teaching Experience

- Assistant Professor at Maulana Azad National Institute of Technology Bhopal,

Madhya Pradesh (*December 2023-Till date*)

- Mathematics-II 2023-2024
- Operational Research 2023-2024
- Programming Lab in Python 2023-2024
- Mathematics-I 2024-2025
- Real Analysis 2024-2025
- Operational Research 2024-2025
- Mathematics-II 2024-2025

- Assistant Professor at Siksha 'O' Anusandhan Deemed to be University Bhubaneswar, Odisha (*July 2022-December 2023*)
  - Calculus-A 2022-2023
  - Applied Linear Algebra 2022-2023
  - Complex Analysis 2022-2023
  - Programming in Python 2023-2024

- Teaching Assistant at IIT Guwahati
  - MA 322 (Numerical Analysis and Finite Difference Methods) 2018–2019
  - MA 102 (Linear Algebra and Ordinary Differential Equations) 2018–2019
  - MA 201 (Complex Analysis and Partial Differential Equations) 2019–2020
  - MA 102 (Linear Algebra and Ordinary Differential Equations) 2019–2020
  - MA 589 (Statistical Foundations for Data Science) 2020–2021
  - MA 573 (Numerics of Partial Differential Equations) 2020–2021
  - MA 102 (Linear Algebra and Ordinary Differential Equations) 2021–2022

Publications (Accepted/Communicated)

1. **K. S. Yadav** and D. C. Dalal. The heterogeneous multiscale method to study particle size and partitioning effects in drug delivery, *Computers and Mathematics with Applications*, 92:134–148, 2021.
2. **K. S. Yadav** and D. C. Dalal, Effects of cell permeability on distribution and penetration of drug in biological tissues: a multiscale approach, *Applied Mathematical Modelling*, 108:355–375, 2022.
3. **K. S. Yadav** and D. C. Dalal, Effects of cell orientation on drug delivery into biological tissues: A computational study, *Applied Mathematical Modelling*, 119:156–173, 2023.
4. **K. S. Yadav** and D. C. Dalal, A multiscale computational study of the effects of fluid flow and drug metabolism on drug delivery, *Computers and Mathematics with Applications*, 130:58–68, 2023.
5. Nilay Mondal, **K. S. Yadav** and D. C. Dalal, Enhanced drug uptake on application

of electroporation in a single-cell model, *The Journal of Membrane Biology*, 256:243–255, 2023.

6. **K. S. Yadav** and D. C. Dalal, Penetration and distribution efficacy of chemotherapeutic drugs in biological tissues, *Mathematics and Computers in Simulation*, 214:152-171, 2023.
7. **K. S. Yadav** and Taiba Zeya, A Mathematical Model of HMGB1 Release in Single-Cell, *European Physical Journal Plus*, 139:922, 2024.
8. **K. S. Yadav** and Gopinath Sadhu**.** Effect of inosine on recurrence of tumor after radiation therapy: A mathematical investigation, *Journal of Theoretical Biology,* 609:112138, 2025.
9. R. Shrivastava, K. Sharma, S. Mishra, P. Parihar, G. Das, K.M. Pandey, A. Maurya, V. Sharma, A. Mishra, S. Kushwaha, R. Khandia, **K.S. Yadav**, A.G. Malhotra, A. Agrawal, J. Singh, M.K. Pandey**.** Integrative Machine Learning Approaches with Genomic Data for Predicting Antitubercular Drug Resistance: A Systematic Review and Meta-Analysis, *Journal of Global Antimicrobial Resistance*, 46:148-157, 2026.
10. Gopinath Sadhu, **K. S. Yadav, S. S. Ghosh** and D. C. Dalal. A noval computational model of asymmetric growth of avascular tumour, Acta Biotheoretica,74(2):9, 2026.
11. Rohit Kumar, **K. S. Yadav** and G. S. Thakur. Hybrid Deep Learning Framework for Skin Disease Classification using EfficientNet-B4 with Handcrafted Features, In proceeding of 1st International Conference on Statistics, Optimization and Machine Learning, Springer (*Accepted*).
12. Rohit Kumar, G. S. Thakur, **K. S. Yadav**. Hybrid deep learning framework for automated skin disease classification: Integrating EfficientNetB6 with local binary patterns and explainable AI, (*Communicated*).
13. Mahendra Kushvaha, Gouranga Pradhan, **K. S. Yadav**. Galerkin finite element method for tumor invasion model with chemotaxis and haptotaxis effects, (*Communicated*).
14. Taiba Zeya and **K.S. Yadav.** HMGB1 release in tumor during radiation therapy: A mathematical investigation, (*Communicated*).
15. Rohit Kumar, G. S. Thakur, **K. S. Yadav**. A Review of Convolutional Neural Network Applications in Skin Disease Classification: Progress, Challenges, and Future Directions, (*Communicated*).

Research Fund/Grants

1. **Title:** Physics Informed Neural Network Framework for Patient Specific Modelling of Blood Flow and Drug Transport in Micro-Blood Vessels via Non-Newtonian Models
   Duration: 5 Years (2025-2030)
   Budget: 30 Lakhs
   Agency: ANRF (ARG-MATRICS)
   Role: PI
2. **Title:** Multiscale Modelling of Chemotherapeutic Delivery in Tumor

Duration: 1 Year (2024-2025)
Budget: 3 Lakhs
Agency: MANIT Bhopal
Role: PI

Conferences (invited & contributed talks, attended)

- **K. S. Yadav,** "PINN-Based Framework for Blood Flow and Solute Dispersion in micro-blood vessels via Multiphase Mathematical Models", International Conference on Mathematical Sciences (ICMSC-2025), NERIST, Arunachal Pradesh, June 26 – 28, 2025 (invited talk).
- **K. S. Yadav**, "Heterogeneous multiscale method in drug delivery", International Conference on Advances in Differential Equations and Numerical Analysis, Guwahati, October 12-15, 2020 (contributed talk).
- **K. S. Yadav**, "Effects of biological cell shape on drug delivery into biological tissues", 2nd International Conference on Applied Mathematics in Science and Engineering, March 24-26, 2022 (contributed talk).
- National conference on recent trends in mathematical modelling and its applications, August 23-27, 2021 (attended).

Workshops Attended

- National Centre for Mathematics workshop on "Continuum Mechanics: Principles and Applications" held at Panjab University, Chandigarh during November 19-24, 2018.
- International Webinar on "Focusing on Mathematical Models and analysis of COVID19 Crisis" organized online by The Maharaja Sayajirao University of Baroda, Vadodara, Gujarat, India during June 17-18, 2020.

Awards & Achievements

- Qualified National Level Joint Admission Test for M.Sc. 2015 in Mathematics.
- Awarded Merit-cum-means scholarship at IIT Delhi.
- Qualified National Eligibility Test December 2016 in Mathematics (Conducted by Council of Scientific & Industrial Research, India for the eligibility for Junior Research Fellowship & eligibility for Assistant Professor both in Indian Universities and Colleges).
- Awarded Ministry of Human Resource Development scholarship for pursuing PhD at IIT Guwahati.

Students Guided

PhD Students

1. Mr. Mahendra Kushvaha (since July 2024), Full-Time.
2. Mr. Pavan (since July 2024), Full-Time.
3. Mrs. Preeti Bansal (since July 2024), Part-Time.
4. Mr. Akash Kumar Nigam (since January 2025), Full-Time (Joint PhD

MANIT-AIIMS Bhopal).

5. Mr. Nitesh Rajpoot (since July 2025), Full-Time
6. Mr. Saurav (since July 2025), Full-Time
7. Mr. PriteshKumar Chensing Pavar

M.Tech Students

1. Yash Vishwakarma
2. Abhi Tyagi
3. Rohit Kumar

MCA Students

1. Arun Kumar Mourya
2. Neeti Patel
3. Tanmoy Mondal
4. Chanchal Das
5. Shivam Anand Bhishan
6. Suman Haldar

B.Tech Students

1. Taiba Zeya (Graduated)
2. Vedant Pachpor (Graduated)
3. Chaitanyaadityasingh Chouhan
4. Srinivas S
5. Karan Dangi
6. Pankaj Soni
7. Om Kapkoti

Institute/Department Level Responsibilities

- Assistant Warden in Hostel H-11 since February 2024
- Member of MTech. Admission committee
- Member of Rajbhasa committee
- ERP Coordinator
- Exam coordinator
- Training and Placement coordinator

Technical Skills

- *Software:* Matlab, Comsol
- *Programming language:* C, Python
- *Operating systems:* Linux and Windows
- Parallel computing (MPI)